



An adaptability limit to climate change due to heat stress

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Abstract:

Despite the uncertainty in future climate-change impacts, it is often assumed that humans would be able to adapt to any possible warming. Here we argue that heat stress imposes a robust upper limit to such adaptation. Peak heat stress, quantified by the wet-bulb temperature T(W), is surprisingly similar across diverse climates today. T(W) never exceeds 31 degrees C. Any exceedence of 35 degrees C for extended periods should induce hyperthermia in humans and other mammals, as dissipation of metabolic heat becomes impossible. While this never happens now, it would begin to occur with global-mean warming of about 7 degrees C, calling the habitability of some regions into question. With 11-12 degrees C warming, such regions would spread to encompass the majority of the human population as currently distributed. Eventual warmings of 12 degrees C are possible from fossil fuel burning. One implication is that recent estimates of the costs of unmitigated climate change are too low unless the range of possible warming can somehow be narrowed. Heat stress also may help explain trends in the mammalian fossil record.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2906879>

Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Other Climate Scenario

Other Climate Scenario: Community Atmospheric Model version 3.1 coupled to a mixed-layer ocean model, with a variety of CO2 levels

Exposure :

weather or climate related pathway by which climate change affects health

Meteorological Factors, Temperature

Temperature: Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Climate Change and Human Health Literature Portal

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact:

specification of health effect or disease related to climate change exposure

Injury, Morbidity/Mortality, Other Health Impact

Other Health Impact: heat stress

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Outcome Change Prediction

Other Projection Model/Methodology: Discussion only

Resource Type:

format or standard characteristic of resource

Research Article

Resilience:

capacity of an individual, community, or institution to dynamically and effectively respond or adapt to shifting climate impact circumstances while continuing to function

A focus of content

Timescale:

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content